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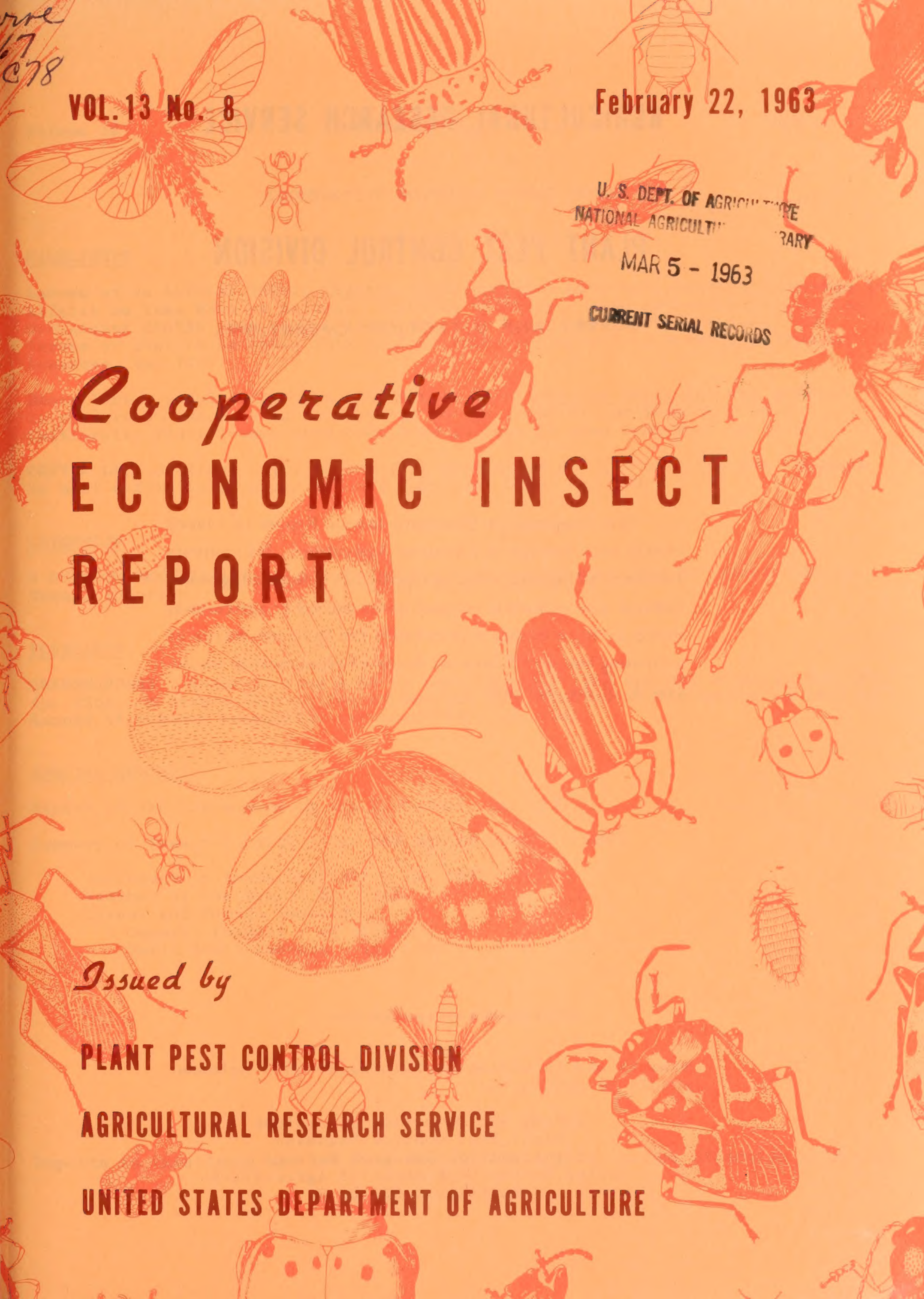

VOL. 13 No. 8

February 22, 1963

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Cooperative
ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

Reports and inquiries pertaining to this release should be mailed to:

Survey and Detection Operations
Plant Pest Control Division
Agricultural Research Service
United States Department of Agriculture
Washington 25, D. C.

Volume 13 February 22, 1963 Number 8

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Larvae of an ALFALFA WEEVIL (*Hypera brunneipennis*) causing considerable damage to alfalfa on Yuma Mesa of Arizona; controls underway. Also active in California. Occasional CLOVER LEAF WEEVIL larva noted in Montgomery County, Kansas; and larvae of what is probably this species found February 5 in Washington County, Arkansas. (p. 115).

Heavy larval populations of a LEAF ROLLER MOTH (*Amorbia essigana*) are present in commercial avocados in La Habra-La Puente areas of Los Angeles County, California; fruit losses have been 5-25 percent in some orchards. (p. 115).

CATTLE LICE continue light to heavy in most areas of Oklahoma, and are annoying to beef cattle in Kane and Millard Counties, Utah. (p. 118).

DETECTION

A DRYWOOD TERMITE (*Incisitermes* (*Kalotermes*) *minor*) recorded for first time in Texas. (p. 119).

FORECASTS

GRASSHOPPERS - Major problem area on rangeland for 1963 appears to be in Montana. (p. 125). A severe infestation of HESSIAN FLY expected in the spring of 1963 in Kansas if weather conditions are favorable. (p. 134).

SPECIAL REPORTS

Status of the Screw-worm in the Southwest. (p. 118).

Summary of Insect Conditions in the United States - 1962

- Introduction (contributors) - (p. 120).
- Weather of the Year - (p. 122).
- Cereal and Forage Insects
  - General Feeders - (p. 125).
  - Small Grain Insects - (p. 130).

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Reports in this issue are for week ending February 15, unless otherwise indicated.

WEATHER BUREAU 30-DAY OUTLOOK

MID-FEBRUARY TO MID-MARCH 1963

The Weather Bureau's 30-day outlook for the period mid-February to mid-March calls for temperatures to average below seasonal normals over most of the Nation except for near to above normal in the northwest quadrant, California, and the Florida Peninsula. Greatest departures are anticipated over the eastern Great Lakes region, the Ohio Valley and the Middle Atlantic States. Precipitation is expected to exceed normal over the southern third of the Nation, accompanying storms moving from off the west coast into the Southwest and thence along the Gulf States and Atlantic seaboard. Subnormal precipitation is expected over the Midwest, and about normal amounts in unspecified areas.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through Superintendent of Documents, Washington 25, D. C. Price $4.80 a year, $2.40 a half year.

WEATHER OF THE WEEK ENDING FEBRUARY 18

Much of the area south of a line from the southern Rockies to the Great Lakes was consistently cool throughout the period and little warming was noted until the final day. From the Great Plains eastward, averages ranged to as much as 15° cooler than those of the week before and Pennsylvania had its 6th consecutive week of below-normal average temperature. Brownsville, Texas, had freezing minima on 2 days, but Huntington, West Virginia, had the greatest deficiency, with a 16° below normal, and St. Johnsbury, Vermont, reported the coldest temperature with a -25° on the 17th. Over the Far West, temperatures were also lower than those of the previous period and the weekly average at Albuquerque, New Mexico, was 26° cooler. The unseasonably warm averages of a week ago which caused local flooding from snowmelt in western Wyoming, had moderated to near normal during this past week, except in northern areas of the Great Plains and west coast, where averages remained generally over 6° above normal. The lowest reported temperature from the Far West was a chilly -34° at Fraser, Colorado, and Alamosa in the south-central San Luis Valley of the same State reported -30°.

Precipitation fell in most areas of the Nation, but was heaviest in coastal areas. Totals were very light in the northern and central Great Plains and the central Mississippi Valley. A persisting deficiency was reported from Arkansas, but showers early and late in the period gave some beneficial moisture to all sections of Texas. Laredo, Texas, received a total of 1.23 inches for the period. Much of the Florida Peninsula received over 2 inches from rains that produced 1 inch statewide. From the severe squall that crossed that State on the 12th, the Broward and Palm Beach areas received over 4 inches. Most precipitation over the Far West came as rain in California and the coastal area of the Pacific Northwest. Scattered precipitation, as snow at higher elevations, also fell in the southern Rockies and central Great Basin area. All but the extreme southern areas of California received over 1/2 inch of rainfall with much of the Central Valley recording totals over 1 inch. Some points recorded over 4 inches. The mountain snowpack remains low and was reported as near the lowest on record for the season from Washington. On the 13th, Stampede Pass, Washington, reported 39 inches, 61 inches less than usual for this time of year. Improved estimates were being reported in the snowpack from Utah, but depths are still critically low. Little if any snow was added to the existing cover except in more susceptible locales of the Northeast. Only light snowfall was recorded in the western Great Lakes area and the deepest cover was reported at 29 inches from both Houghton and Marquette Airports in Michigan. Up to 1 foot of new snow to the lee of Lake Ontario kept the depth in that area to as much as 6 feet. Falls of 10 inches in New England during the first half of the week added to the already heavy cover, and depths of 4 feet were measured in northern areas and central Maine. (Summary supplied by U. S. Weather Bureau).

CEREAL AND FORAGE INSECTS

GRAIN APHIDS - KANSAS - None found in wheat and barley fields examined in southwest area. (Peters). OKLAHOMA - Populations of GREENBUG (Schizaphis graminum*), ENGLISH GRAIN APHID (Macrosiphum avenae*) APPLE GRAIN APHID (Rhopalosiphum fitchii) and CORN LEAF APHID (R. maidis) continue at noneconomic level throughout State; also continue negative in many areas. (Okla. Coop. Sur.). TEXAS - Schizaphis graminum* and other small grain pests have been of no significance to date due to extremely cold weather during recent weeks. (Newton).

WINTER GRAIN MITE (Penthaleus major) - OKLAHOMA - Light counts of 30-100 per 10 linear feet recorded in Beckham County. (Okla. Coop. Sur.) TEXAS - Has been of no significance to date because of extremely cold weather. (Newton).

CUTWORMS - ARIZONA - Present in lawns in Maricopa and Yuma Counties and few noted in some alfalfa on the Yuma Mesa. Causing some injury to rangeland in Mohave County. (Ariz. Coop. Sur.).

WEEVILS (Hypera spp.) - CALIFORNIA - Medium numbers of H. brunneipennis adults beginning to feed; currently present in lawns in Vista, San Diego County. (Cal. Coop. Rpt.). ARIZONA - H. brunneipennis larvae causing considerable damage to alfalfa on the Yuma Mesa; controls underway. However, desired results not being obtained in some instances unless ground machinery is used. (Ariz. Coop. Sur.). KANSAS - Occasional H. punctata larva noted on south facing roadside embankment in Montgomery County. (Peters). ARKANSAS - Larvae collected February 5 from red clover in Washington County, northwest, appear to by Hypera sp., probably punctata. Larvae collected 2-3 days after rather cold weather; minumum daily temperatures about 10°F. (Ark. Ins. Sur.).

SPOTTED ALFALFA APHID (Therioaphis maculata) - KANSAS - Single adult collected when plant material and debris from 2 plants processed through Berlese funnel. Plants collected on south facing roadside embankment in Montgomery County. (Peters).

FURIT INSECTS

WESTERN PEACH TREE BORER (Sanninoidea exitiosa graefi) - CALIFORNIA - Spotted, heavy infestations present in peach trees in Brentwood, San Joaquin County. (Cal. Coop. Rpt.).

ORIENTAL FRUIT MOTH (Grapholitha molesta) - ARKANSAS - Examinations of trees in Crowley Ridge peach-growing area in eastern portion of State show 90 percent of twigs infested by late 1962 populations. (Ark. Ins. Sur.).

EASTERN TENT CATERPILLAR (Malacosoma americanum) - TEXAS - Egg cases very abundant on peach twigs in Erath County area. Microsopic examination of 10 egg masses showed 90 percent viability of overwintering larvae. (Millikein, Newton).

PECAN WEEVIL (Curculio caryae) - ARKANSAS - Infested 40 percent of pecan nuts left in field in Lee County, east central area. (Ark. Ins. Sur.).

OBSCURE SCALE (Chrysomphalus obscurus) - ARKANSAS - Observed on pecan in Lee County, east central area. (Ark. Ins. Sur.).

A LEAF ROLLER MOTH (Amorbia essigana) - CALIFORNIA - Heavy larval populations widespread in commercial avocados in La Habra-La Puente areas of Los Angeles County. Fruit losses have been 5-25 percent in some orchards. Infestations of this pest usually held at lower levels by biological control which has not been effective this season. (J. Beutel, Ext. Serv.).

* See CEIR 13(5):84.

COTTONY-CUSHION SCALE (Icerya purchasi) - CALIFORNIA - Heavy on citrus trees in Penryn area, Placer County. Cold weather may have reduced or eliminated populations of vedalia (Rodolia cardinalis) in local areas so that biological control of I. purchasi may be delayed until warm weather and vedalia populations have an opportunity to increase. (Cal. Coop. Rpt.). ARIZONA - Present in few lemon groves on the Yuma Mesa. (Ariz. Coop. Sur.).

GREENHOUSE WHITEFLY (Trialeurodes vaporariorum) - CALIFORNIA - Medium to heavy on several varieties of lemon in Sacramento, Sacramento County. (Cal. Coop. Rpt.).

YUMA SPIDER MITE (Eotetranychus yumensis) - ARIZONA - Present in some lemon and tangerine groves on the Yuma Mesa. (Ariz. Coop. Sur.).

TRUCK CROP INSECTS

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - TEXAS - Larvae infesting turnips in Trintiy County. Degree of damage or infestation not given. (Lange, Newton).

CABBAGE APHID (Brevicoryne brassicae) - GEORGIA - Light on cabbage in Colquitt County. (Johnson).

BEET LEAFHOPPER (Circulifer tenellus) - CALIFORNIA - Winter spray program resumed after temporary shutdown due to adverse weather conditions. Canyon areas of western Fresno, Merced, Stanislaus and San Joaquin Counties treated by helicopter, with approximately 10,000 acres covered. In Imperial Valley, Imperial County, female beet leafhopper populations, averaging 3.5 per 100 sweeps of annual weeds on desert floor, show material egg development at present time. It still appears that as much as 20,000 acres may be subject to spring treatments. (Cal. Coop. Rpt).

BEET ARMYWORM (Spodoptera exigua) - ARIZONA - Larvae continue to feed on lettuce in Maricopa County. (Ariz. Coop. Sur.).

CABBAGE LOOPER (Trichoplusia ni) - ARIZONA - Continues to feed on lettuce in Maricopa County. (Ariz. Coop. Sur.).

TOBACCO INSECTS

TOBACCO FLEA BEETLE (Epitrix hirtipennis) - GEORGIA - Feeding damage light on tobacco in plant bed in several southern counties. (Johnson).

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - GEORGIA - Feeding damage light on tobacco in plant bed in several southern counties. (Johnson).

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

BARK BEETLES - CALIFORNIA - Dendroctonus brevicomis and Ips spp. currently attacking ponderosa pine in Doggett Creek area of Klamath National Forest. Beetles attacking young saw-timber in groups in 600-acre stand. (G. S. Robinson, USFS). Killing ponderosa pine singly and in groups of 5 or more in 300-acre stand in Deafy Glade with infestations spreading into adjacent Mendocino National Forest land; and in Lower Letts Valley recreation area, where over 50 trees in 20-acre plot have been killed as result of untreated logging slash on adjacent property. (C. E. Fargo, CDF).

A GEOMETRID MOTH (Hydriomena nubilofasciata) - CALIFORNIA - Heavy populations present on Quercus agrifolia (California live oak) in Oakland, Alameda County. (Cal. Coop. Rpt.).

A JUNIPER TWIG MOTH (*Periploca nigra*) - CALIFORNIA - Light on juniper twigs in La Habra, Orange County. (Cal. Coop. Rpt.).

GREENHOUSE WHITEFLY (*Trialeurodes vaporariorum*) - CALIFORNIA - Medium to heavy on gardenia bushes in Sacramento, Sacramento County. Heavy on poinsettia leaves in Encinitas, San Diego County. (Cal. Coop. Rpt.).

BEAN APHID (*Aphis fabae*) - CALIFORNIA - Medium on *Tropaeolum* sp. (nasturtium) in San Francisco, San Francisco County. (H. B. Leech, Calif. Acad. Sci.).

AN ARBORVITAE APHID (*Cinara tujafilina*) - NEW MEXICO - Generally light on arborvitae in southern counties. Honeydew very noticeable on some plants. (N. M. Coop. Rpt.).

A PALM APHID (*Cerataphis variabilis*) - NORTH CAROLINA - Collected from an unspecified palm in Wake County, January 31. Det. by C. F. Smith. Palm recently imported into State. (Mount).

A WILLOW APHID (*Lachnus salignus*) - CALIFORNIA - Present on budding pussy willow in San Diego County and few other locations. Species has become more obvious during past year than previously noted. (Cal. Coop. Rpt.).

COTTONY-CUSHION SCALE (*Icerya purchasi*) - TEXAS - Heavy locally and attacking yard shrubbery in Llano County. (Verdell).

TEA SCALE (*Fiorinia theae*) - TEXAS - Heavy, local population destroying camellia plants in Gregg County. (Blair).

EUONYMUS SCALE (*Unaspis euonymi*) - NEW MEXICO - Light to unusually heavy on euonymus plants in Albuquerque area, Bernalillo County. (N. M. Coop. Rpt.).

A WAX SCALE (*Ceroplastes* sp.) - MARYLAND - Heavy on Japanese holly and flowering crab apple tree at Rivera Beach, Anne Arundel County. (U. Md., Ent. Dept.).

A THRIPS (*Franklinella occidentalis*) - CALIFORNIA - Medium populations in orchid flowers in Los Osos, San Luis Obispo County. (Cal. Coop. Rpt.).

AN ERIOPHYID MITE (*Callyntrotus schlectendali*) - CALIFORNIA - Populations medium on rose nursery stock in Ojai, Ventura County. This mite fairly general in occurrence but rarely does obvious damage to foliage. (Cal. Coop. Rpt.).

INSECTS AFFECTING MAN AND ANIMALS

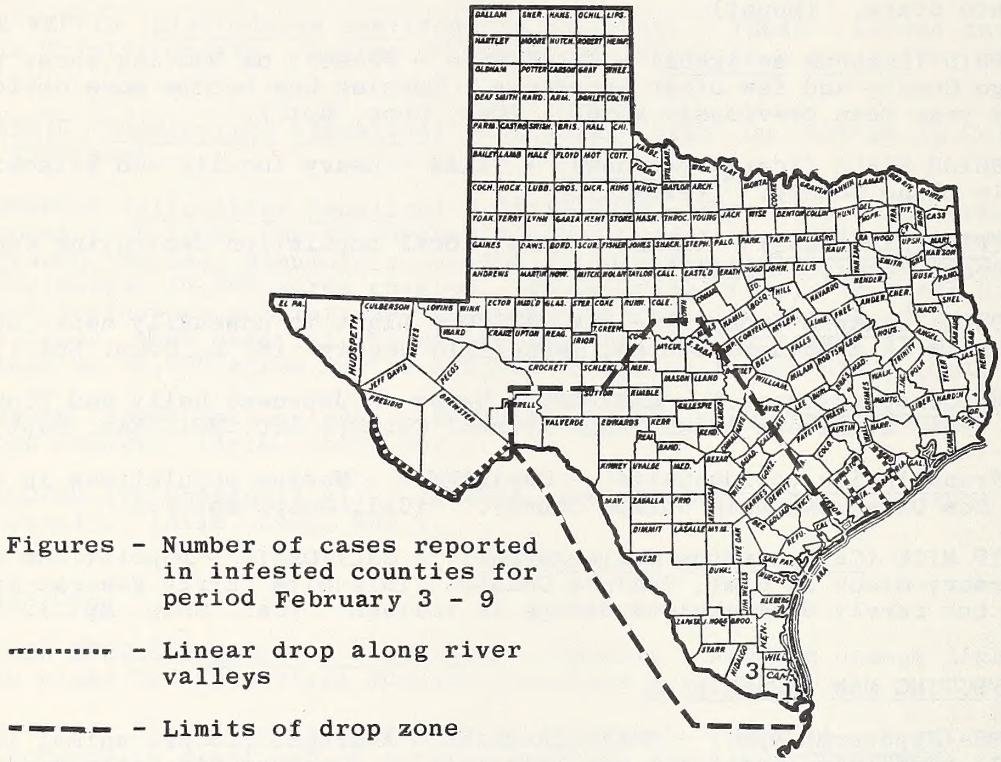
CATTLE GRUBS (*Hypoderma* spp.) - NORTH CAROLINA - Averaged 5.5 per animal in 26 one-year-old beef animals and 1.8 per animal in 14 two-year-old animals examined in Wake County; all animals native to area. The 12 *H. lineatum* grubs collected estimated to have been in backs of animals 2-4 weeks and 14 *H. bovis* grubs estimated to have been in backs of animals one day to 2 weeks. Of 90 dairy cows also examined in Wake County, only one had any grubs; however, these animals only in pasture during morning hours last spring. *H. bovis* was detected in several areas of State during surveys conducted in 1948 and 1949. Det. by W. G. Bruce. (Jones, Mount). OKLAHOMA - *H. lineatum* continues active with 14 grubs per head noted on calves in Noble County; other counts per head, by county, were 0-10 in Garvin, 0-20 in Bryan; ranged light to medium in Haskell and Hughes Counties. (Okla. Coop. Sur.).

MOSQUITOES - TEXAS - Adults of *Aedes sollicitans* and *Culiseta inornata* caused some concern in Jefferson County during warmer days in January. (Jefferson Co. Mosq. Control Comm., Jan. Rpt.).

STATUS OF THE SCREW-WORM (Cochliomyia hominivorax) IN THE SOUTHWEST

During the period February 3-9, specimens were submitted from 4 screw-worm infestations on 3 premises in the 2 southernmost counties in Texas. These are least number of specimens submitted for identification since eradication efforts began in February 1962. The Cage Ranch near Falfurrias, Brooks County, Texas, which has been most serious trouble spot in recent weeks, as demonstrated by number of specimens submitted for identifications, has reported no screw-worm during this period. However, 5 sterile egg masses have been found on wounded animals on this premise.

A total of 113,411,450 sterile screw-worm flies was released and 4 screw-worm cases were submitted during the period February 3-9. (Anim. Dis. Erad. Div.).



Figures - Number of cases reported in infested counties for period February 3 - 9

··········· - Linear drop along river valleys

— — — - Limits of drop zone

HOUSE FLIES (Musca sp.) - NEW MEXICO - Unusually abundant during first week of February, when daytime temperatures ranged 70-80°F. in many areas of State. (N. M. Coop. Rpt.).

CATTLE LICE - OKLAHOMA - Infestations continue light to heavy in most areas of State with counts of 2 per hair part on yearling steers and 6 per hair part noted on mature cows in Noble County; 40 percent of mature cows in Pushmataha County heavily infested, with light to heavy numbers reported in Bryan, Cotton, Garvin, Blaine, Hughes, Haskell, Le Flore, Mayes and Kingfisher Counties. (Okla. Coop. Sur.). UTAH - Annoying to herds of beef cattle in Kane and Millard Counties. (Knowlton).

HOG LOUSE (Haematopinus suis) - OKLAHOMA - Populations ranged light to heavy on swine in Bryan, Cotton, Garvin and Mayes Counties. (Okla. Coop. Sur.).

HOUSEHOLD AND STRUCTURAL INSECTS

BOXELDER BUG (Leptocoris trivittatus) - UTAH - Annoyance unusually serious in homes in central and northern portions of State during unusually warm period in early February; however, recurrence of cold weather has reduced this annoyance. (Knowlton). NORTH CAROLINA - Present in an office in Wake County. (Wray).

ELM LEAF BEETLE (Galerucella xanthomelaena) - MARYLAND - Hibernating adults caused nuisance in home at Mitchellville, Prince Georges County. (U. Md., Ent. Dept.).

CLOVER MITE (Bryobia praetiosa) - UTAH - Entered few homes in general area of Salt Lake City during warm period early in February. (Knowlton). NORTH CAROLINA - Infesting a building in Wake County. (Wray).

A DRYWOOD TERMITE (Incisitermes (Kalotermes) minor) - TEXAS - Specimens recorded from hardwood furniture in San Antonio, Bexar County, during January contribute a new State record for this species. Det. by T. E. Snyder. (McGregor, Dorward).

STORED-PRODUCT INSECTS

AN OTITID FLY (Chrysomyza sp., probably demandata) - TEXAS - Larvae heavy locally in silage stored in Mitchell County. (Logsdon).

MEALWORMS (Tenebrio spp.) - UTAH - Infesting feed on farm at Tremonton, Box Elder County. (Knowlton).

MISCELLANEOUS INSECTS

CITRUS WHITEFLY (Dialeurodes citri) - CALIFORNIA - Survey continues in City of Sacramento with nearly 300 infested blocks recorded. Border areas somewhat inconsistent in infestations and few outlying blocks found infested, which increases spray area. Over 400 city blocks to be given eradicative treatment, with over 150 of these already treated. Wind and rain have inhibited program, both survey and treatment; 5 spray crews currently operating and 5 County and State survey crews delimiting area. Over 1,000 city blocks inspected to February 15; over 60,000 gallons of spray material applied to host plants in 150 block area treated as of same date. (Cal. Coop. Rpt.).

GREEN PEACH APHID (Myzus persicae) - ARIZONA - Noted on many weeds along roadsides in Yuma County; very few winged forms seen. (Ariz. Coop. Sur.).

PUSS CATERPILLAR (Megalopyge opercularis) - NORTH CAROLINA - Cocoon collected from apple twig in Cabarrus County. (Robertson).

CORRECTIONS

CEIR 13(2):20 - Euborellia annulipes (red-legged earwig) should read Euborellia annulipes (ring-legged earwig).

CEIR 13(3):29 - A WHITEFLY (Aleyrodes spiraeoides) - CALIFORNIA - Should read "... developing on leaves and fruit..."

LIGHT TRAP COLLECTIONS

GEORGIA, Tifton (1/31-2/13) - No collections. SOUTH CAROLINA, Charleston (1/21-27) - No collections.

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1962

INTRODUCTION

The summary of insect conditions beginning in this issue and continuing in several succeeding issues of the Cooperative Economic Insect Report was compiled in Survey and Detection Operations from annual summaries that were submitted by State and Federal cooperators. This is the fourth year that a summary of this nature has been published. The summary will follow the same format which is used in the weekly issues of the CEIR, with some minor exceptions.

Survey and Detection Operations is especially grateful to each individual who assisted with the preparation of the 1962 summary. Listed below are the names of individuals who helped assemble the data.

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ALASKA
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CALIFORNIA
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COLORADO
L. E. Jenkins; assisted by A. D. Bulla, F. C. Schweissing, W. H. Hantsbarger, et al.

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DELAWARE
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GEORGIA
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IOWA
Summary notes taken from weekly reports.

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NEW JERSEY
Summary notes taken from weekly reports.

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WASHINGTON
C. A. Johansen; assisted by federal, state and field entomologists

WISCONSIN
M. S. Conrad

WYOMING
D. G. Fullerton

Also included in the 1962 summary are notes from the following special reports.

"Summary of Fruit Insect Conditions, 1962 New York-New England Fruit Spray Specialist Conference", compiled by L. W. Boulanger, Maine Agricultural Experiment Station, from the conference held at Amherst, Massachusetts, October 29-30, 1962.

"Forest Insect Conditions in the United States - 1962". Those individuals that compiled or contributed to this summary were Leo Abrahamsen, S. D. Adams, Gerald Beach, J. L. Bean, J. W. Bongberg, W. D. Buchanan, David Crosby, Raymond Dolan, G. L. Downing, P. R. Flink, Ramon Gass, M. K. Idleman, David Ketcham, D. D. Lucht, David McComb, S. W. Meso, Jr., G. E. Moore, L. H. Moore, P. W. Orr, D. W. Renlund, E. G. Rennels, T. T. Terrell, Scott Tunnock, A. C. Valcarce, Dale VanDenburg and R. I. Washburn. This forest summary is issued by the U. S. Forest Service and will be available upon request later in 1963.

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WEATHER OF THE YEAR 1962 1/

The weather of 1962 was characterized by great temperature fluctuations, with record-breaking cold waves during the first 4 months and again in December, midsummer heat during May east of the Rockies, and a cool summer in the northern two-thirds of the Nation. Weather conditions generally were favorable for agriculture, with total crop production for the year among the highest on record. Severe local storms which always take a considerable toll of life and property during the warm season of the year were less frequent than in many other years. No hurricanes entered the mainland. Flood losses were low.

A great cold wave that ranks among the most severe on record highlighted the weather of the year's first month. As it crossed the northern Rockies on the 9th, a sea-level pressure reading of 31.40 inches at Helena, Montana, was the highest ever recorded in the United States, including Alaska and Hawaii.

In Texas, the cold wave from January 9 to 12 was comparable to the disastrous cold waves of February 1951 and February 1899. The Lavaca River at Hallettsville froze from bank to bank (the river is 35 feet wide there) for the first time in 60 years. Galveston Bay at Texas City froze over from the shore to 100 yards out, the first such occurrence in 62 years according to long-time residents. In San Antonio and vicinity, lakes and streams froze over for the first time since 1918.

Many other sections of the South had their lowest temperatures since 1899. New Orleans, Louisiana, and Mobile, Alabama, had their longest periods of subfreezing on record, 67 and 86 consecutive hours, respectively. At the latter station where a low of 13° occurred, bays north of the Causeway froze over with 2 to 3 inches of ice except for channels.

Snow fell at locations along the Gulf and California coasts where snow is rather rare. Snowfall was unusually heavy during January in the middle Mississippi Valley, but light in the Far West and unusually light in the Northeast where Boston's 2.5 inches was a January low for 90 years.

This January cold wave was a record-breaker in some northern sections, too. Denver, Colorado, had 14 days with a minimum of zero or below, the most for January since 1875, and Huron, South Dakota, had continuous subzero temperatures from the 17th through the 21st, the longest such period there since 1936.

1/ L. H. Seamon, Climatology, Weather Bureau, Washington, D. C.

Extreme lows of -55° were recorded in Montana, Wyoming and Colorado, establishing a new January record in the latter State. A low of -47° in New Mexico was also the lowest temperature ever recorded in that State during January.

In the South, this great freeze from January 9 to 12 was blamed for many millions of dollars damage, and ranks among the most damaging freezes of this century. New Orleans, Louisiana, alone estimated its losses at $15 million and estimates for Baton Rouge, Louisiana, and Meridian, Mississippi, were placed at $5 million and $1 million, respectively. Citrus incurred heavy damage in southern Texas and some crop damage occurred in Florida.

During another severe cold wave at the end of January and the beginning of February, temperatures dropped to new record lows for February in Vermont (-48°) and Maine (-44°) on the 2d. This cold wave was followed by a winter warmup that sent temperatures to new record high levels for February in Wyoming, 78°; Missouri, 90°; Illinois, 83°; Tennessee, 85°; North Carolina, 88°; South Carolina, 89°; and Florida, 94°.

A cold wave at the beginning of March reduced temperatures to the lowest levels on record for that month in Wisconsin (-48°), Iowa (-35°), and Illinois (-21°). Snowfall, extremely heavy in the Middle Atlantic States, North Central Interior and the Far West during February and March, was of great importance in the latter area in building up the mountain snowpack. Record amounts of more than 20 inches fell in Iowa where depths sometimes exceeded 3 feet locally.

A storm off the north Atlantic coast on March 6 and 7 was named "The Great Atlantic Coastal Storm", owing to its unusual violence. Winds up to 85 m.p.h., were responsible for swells up to 30 feet high which battered coastal installations from Maine to Florida. The death toll was 33, injuries numbered 1,252, and dwellings either damaged or destroyed were counted in the thousands. Losses totaled many millions of dollars.

A cold wave early in April reduced temperatures to record low levels for so late in the season in some northern areas, with freezing in New Mexico and frost in northern Florida. During a heat wave that spread westward across the Nation, the latter half of the month, temperatures soared to record high levels for so early in the season at many stations.

Midsummer heat prevailed during much of May in the southern two-thirds of the area east of the Rockies, but the month was cold and wet west of the Great Lakes, and in the Far West, and very dry in parts of the Northeast. This was the warmest May during a record dating back 87 years at Dodge City, Kansas; 89 years at Chicago, Illinois; 84 years at Thomasville, Georgia; and 91 years at Mobile, Alabama. Highest temperatures so early in the season for cities with long-term records included 100° at Wichita, Kansas, on the 25th; 99° at Jacksonville, Florida, on the 20th; and 94° at Alpena, Michigan, on the 16th.

The summer of 1962 was pleasantly cool in the northern two-thirds of the Nation, but was hot and humid in the Gulf States. At Boston, Massachusetts, the temperatures failed to rise to 90° during the summer for the first time in 58 years. Precipitation was heavier than usual in most of the Great Plains and Rocky Mountain region, and below normal from the Mississippi Valley to the Appalachians, in southern Texas, and west of the Rockies. Drought began to develop in parts of eastern Pennsylvania, northern New Jersey, southeastern New York, and southern New England in June and became rather severe before being ended by August rains, the first of which fell from about the 6th to 11th. Washington, D. C., had its driest August (0.55 inch) and driest summer (4.62 inches) since records began in 1871.

Wind and hailstorms were numerous in north central areas during June. A tornado in the Texas Panhandle on June 1, caused over $6 million damage. Hail and wind caused $2 million damage in Omaha, Nebraska, on July 21, and $2-1/2 million at

Dubuque, Iowa, on July 22. In August, thunderstorms with hail and wind caused several million dollars damage in southeast Michigan and northwest Ohio on the 8th. On August 20, a tornado killed 4 persons, injured several others, and caused $1 million property damage in the western portion of Cleveland, Ohio, and a tornado at Cameron, Louisiana, on the 28th killed 6 persons.

Autumn temperatures and precipitation were for the most part uneventful, except for unusually early snowfall in northern areas during September. Storms on the north Pacific coast on October 11, 12 and 13 were blamed for more than 50 deaths and property losses estimated in the neighborhood of $250 million. On October 4 to 7, rains from storms off the New England coast caused flooding which resulted in several million dollars damage, and high winds along the Maine coast caused additional damage estimated at several million dollars.

Highlighting December weather was the severe cold wave which was responsible for extremely cold weather east of the Rocky Mountains and record-breaking low temperatures for December at numerous stations in the southeastern quarter of the Nation. The cold wave moved into the northern Great Plains late on the 10th and covered the entire East late on the 12th. Numerous stations recorded their lowest December temperatures of record on the 13th. A list of some of these stations and their low temperatures are as follows:

Montgomery, Alabama	5°	Lake Charles, Louisiana	18°
Daytona Beach, Florida	21°	Meridian, Mississippi	4°
Jacksonville, Florida	12°	Vicksburg, Mississippi	9°
Tampa, Florida	18°	Asheville, North Carolina	-6°
Rome, Georgia	0°	Chattanooga, Tennessee	2°
Savannah, Georgia	9°	Nashville, Tennessee	7°
Thomasville, Georgia	8°	Appalachicola, Florida	13°
Baton Rouge, Louisiana	11°		

In addition, December lows were equaled at Nantucket, Massachusetts, -3°; Miami, Florida, 35°; and Atlanta, Georgia, 1°. The low at Tampa, Florida, was the lowest ever recorded there in any month. Damage, while widespread in the South, was heaviest in Florida, where the crop losses were expected to total many millions. In Louisiana, over half of the stations from Houma in the south to Ruston in the north equaled or broke their alltime December minima on the 13th when Tallulah, Clinton and Covington reported lows of 7°. In Mississippi, University Station at Oxford reported a low of 0°. Unseasonably cold weather continued east of the Rockies the remainder of December except for a brief period of moderation during the third week. The month ended with unseasonably cold weather over the entire Nation. The 30th and 31st were bitterly cold in New England where a combination of subzero temperatures and high winds with gusts exceeding hurricane force created an extreme wind chill.

Precipitation was less than half normal in large portions of the Mississippi Valley, Utah, Nevada and western Arizona. At Phoenix, Arizona, rain beginning on December 17 ended the driest period for March 1 through December 16 on record. The Los Angeles, California, Airport recorded only 0.10 inch for the last 6 months of 1962.

Much below normal snowfall in the Far West during December left the mountain snowpack extremely low at the end of 1962. In many areas, near record low amounts were reported. Snowfall was frequent in the northeastern quarter of the country the latter part of the month. During a storm over the Northeast on the 30th-31st, from 30 to 35 inches of snow fell in central and eastern Maine, with lesser amounts in the remainder of the Northeast. In Washington, D. C., 16.2 inches was the most snow for December since 1888. Other record amounts for December included 41.9 inches at South Bend, Indiana; 54.2 inches at Muskegon, Michigan; and 30.3 inches at Cleveland, Ohio.

A severe winter storm in the Northeast on the 30th and 31st, created severe blizzard conditions in Maine, and parts of New Hampshire, Vermont and New York. Sustained winds exceeded 40 m.p.h., and temperatures dropped to -10° to -20°. Albany, New York, reported wind gusts up to 60 m.p.h. at 2:30 a.m. of the 31st and a -10° temperature. Many communities were isolated, with much personal hardship resulting from lack of power, communication and transportation facilities. A daily newspaper in Bangor, Maine, missed publication for the first time in 73 years.

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SUMMARY OF INSECT CONDITIONS - 1962

CEREAL AND FORAGE INSECTS

General Feeders

Highlights:

Widespread GRASSHOPPER infestations did not develop in 1962, but some damaging populations did require controls. Crop and range damage in Utah was conservatively estimated at over $1,250,000, and an estimated 1,472,645 acres of crops were treated in Illinois thereby saving farmers about $6,885,872. Populations in Illinois were more abundant than they have been at any other time in the past 15 years, and damage was more evident in Wisconsin and Indiana than in 1961. The major trouble area on rangeland for 1963 appears to be Montana. ARMY CUTWORM was damaging locally during the spring in several of the Western States, with Wyoming and Nebraska reporting more than normal damage from this pest. Alfalfa was damaged the most in Wyoming, while winter wheat, alfalfa and other crops suffered in areas of North Dakota, Nebraska, Kansas, Colorado, New Mexico and Texas.

The 1961 fall adult GRASSHOPPER surveys indicated heavy populations over a wide area, but widespread infestations did not develope in 1962 due to the cold, wet spring. Some damaging populations did develop, however, and required controls. Over 190,000 acres of rangeland were cooperatively treated in 9 states. In addition, over 7,000 acres of wildlife refuges were treated in CALIFORNIA, NORTH DAKOTA and OREGON. The grasshopper outlook for 1963 indicates moderate to heavy populations on over 7,800,000 acres of rangeland in 16 Western and Midwestern States. The major trouble area appears to be MONTANA. (See map in CEIR 13 (2):1-11-63).

In CALIFORNIA, indications of heavy grasshopper infestations were noted developing in meadow grass in April in San Diego County. During the same period, grasshoppers were light on alfalfa in the Scott Valley area of Siskiyou County, developing on alfalfa and filaree in San Diego County, and light to medium on pasture grasses in local areas of Butte County. By May, light infestations were present on range, pastures and alfalfa in Shasta, San Diego, Amador, Placer, Siskiyou, Tehama, Yolo and Calaveras Counties. Medium to heavy populations developed in Siskiyou County later and fairly heavy numbers were present in Imperial County. They were also medium in Humboldt County and medium in local areas of San Bernardino and Yolo Counties. No serious invasions of croplands developed during 1962. Grasshopper populations almost doubled over 1961 in NEVADA, with the major increases occurring in Elko, Eureka, Lander and Humboldt Counties. Most of these increases were on rangeland with *Aulocara elliotti*, CLEAR-WINGED GRASSHOPPER (*Camnula pellucida*), MIGRATORY GRASSHOPPER (*Melanoplus sanguinipes*), and

Oedaleonotus enigma as the dominant species. A total of 6,400 acres of crested wheatgrass and adjacent rangeland was treated in Humboldt County with satisfactory results. The 1962 adult grasshopper survey showed economic infestations on 101,100 acres in Nevada; 82,100 of which are rangeland and 19,000 of which are cropland, located primarily in the above listed counties.

This was a serious year for grasshoppers in UTAH, with most extensive outbreaks occurring in San Juan, Box Elder, Sanpete, Juab and Iron Counties. Crop and range damage was conservatively estimated to exceed $1,250,000. Had it not been for the excellent range conditions due to an abundance of spring moisture, both crop and range damage would have been more severe. It is estimated that 45 percent of the 40,000-acre wheat crop, 60 percent of the dry bean crop of 12,000 acres and 10 percent of the grass over 25,000 acres, in the more severely infested areas of San Juan County, were destroyed by grasshoppers. The farmer, rancher, orchardist control programs are estimated to have exceeded 200,000 acres sprayed for grasshopper control in Utah. In addition, 12,079 acres were aircraft sprayed in the Sanpete-Juab area and 14,266 acres in Iron County to protect range and forest lands as a cooperative Federal-State-rancher program. Grasshoppers at the end of 1962 threatened at least 567,500 acres of cropland and 443,700 acres of rangeland in Utah for 1963.

Several infestations of range grasshoppers, Aulocara elliotti, Ageneotettix deorum, Amphitornus coloradus, Cordillacris occipitalis, Melanoplus occidentalis, migratory grasshopper and TWO-STRIPED GRASSHOPPER (Melanoplus bivittatus) occurred during 1962 in WYOMING. The number of acres of rangeland cooperatively controlled in Wyoming are as follows: Crook County - 644; Goshen County - 13,745; Lincoln County - 4,000; Niobrara County - 7,555; Platte County - 2,430. The total acres were 28,374 and the cost was $19,440.55 or an average of 69 cents per acre. All acreage was controlled by aircraft except for 458 acres in Crook County which were worked with a Buffalo Turbine ground unit. The 4,000 acres in Lincoln County, Wyoming, were all on the Bridger National Forest. All other infestations in Wyoming were on privately owned lands. Rangeland infestations of grasshoppers in MONTANA were not considered of great importance in 1962. Abundant rains produced excellent grass growth and, even in areas which were considered critical the year before, practically no grass damage occurred. No large areas of range were treated during 1962 in Montana. Cropland grasshoppers were still common in some northeastern Montana counties and some roadside and field margin controls were applied. The main cropland species were migratory grasshopper, clear-winged grasshopper and two-striped grasshopper.

There was a decided drop in grasshopper populations throughout the eastern counties of WASHINGTON, where the problem principally exists, primarily because of the unfavorable weather conditions for nymphal survival. Moderate infestations were troublesome over sizeable acreages, especially rangelands, in Klickitat, Lincoln, Okanogan and Stevens Counties; however, as against the 1962 adult survey, only 130,700 acres were found infested in five scattered counties; namely Asotin, Garfield, Klickitat, Lincoln and Okanogan. The principal species were migratory grasshopper and two-striped grasshopper.

Grasshopper infestations in NEW MEXICO were lighter than was anticipated in rangeland areas this past spring, and the adult survey during the fall of 1962 indicated the infested acreage to be the lowest in several years, although there appears to be a population increase in the northeast part of the State. Extreme drought conditions prevailed in areas infested in 1961. Severe hailstorms apparently destroyed nymphs in some areas. Grasshoppers also damaged seedling tomatoes at Deming during early May and defoliated trees, shrubs and flowers in small areas of the Albuquerque section in September and October. In COLORADO, migratory grasshopper, RED-LEGGED GRASSHOPPER (Melanoplus femurrubrum), DIFFERENTIAL GRASSHOPPER (Melanoplus differentialis), PACKARD GRASSHOPPER (Melanoplus packardii), Melanoplus occidentalis, M. confusus, two-striped grasshopper, M. lakinus, Aulocara elliotti, Ageneotettix deorum and Amphitornus coloradus occurred at levels of economic importance in grassland in the following counties: Huerfano, San Miguel, Dolores, La Plata, Archuleta, Custer, Fremont and Douglas. Huerfano County was the only area in which a cooperative program was carried out. In Huerfano County, there were 110,000 acres of grasshopper-infested land, with counts of 12-75 per square yard; 13,500 acres were treated under a cooperative contract. In the other areas infested, the acreage was too scattered to make a program economically feasible. In Kiowa and Cheyenne Counties, grasshoppers, feeding on the borders of fall-planted wheat, damaged one to two drill widths. In the southwestern area of Colorado, grasshoppers migrated from soil bank land into the wheat and caused considerable damage. Populations in this area of the State averaged 15-60 per square yard on soil bank land and 5-40 per square yard on wheat.

Many species of grasshoppers caused locally heavy damage to rangeland in areas of central, north central and northwest TEXAS, but they did not cause damage in widespread areas. In OKLAHOMA, first instars were noted in the west central areas in mid-April. Activity continued through September. Generally, light damage was confined to localized areas, especially in the south central, northwest and panhandle areas. Predominant grasshopper species were *Ageneotettix deorum*, *Amphitornus coloradus*, *Phlibostroma quadrimaculatum*, two-striped grasshopper, differential grasshopper, red-legged grasshopper, *Melanoplus occidentalis*, Packard grasshopper and *Mermiria maculipennis*. Grasshoppers continued to be scarce in most areas of KANSAS, with only a few farmers applying controls in the western area. The dominant species were red-legged grasshopper, migratory grasshopper, two-striped grasshopper and differential grasshopper. A new problem area showed up in certain northeastern counties.

Scattered grasshopper infestations occurred in crop and range lands in NEBRASKA, producing an increase in both population numbers and area infested. Infestations in cropland occurred primarily on idleland in the northeast. Rangeland populations were more severe in the northwest. Populations built up to considerable numbers in the early spring, but decreased in some areas during the early summer due to unfavorable climatic conditions. Ideal growing conditions with ample moisture overshadowed much of the grasshopper damage. This allowed populations to remain stable for egg deposition. Egg concentrations coincided with adult populations.

A few first instars of migratory grasshopper and two-striped grasshopper were reported during the week of May 8-14 in SOUTH DAKOTA. During this period, the average egg development in the central region of South Dakota for all species was 50 percent coagulated, 35 percent eyespot and 15 percent segmented. Heavy populations of *Melanoplus* spp. were reported from Gregory County alfalfa fields the following week. By the week of June 18, nymphal counts in the west river area ranged from 5 to 10 per square yard, with a few spots having counts of 12 to 15 per square yard. Most of the 'hoppers were first and second instars, with some being third and a few in their fourth instar. Throughout the summer, scattered outbreaks were found, reported and controlled before any damage of concern could be caused. The adult grasshopper survey started during the week of August 7-14 in South Dakota, with the results showing that both rangeland and cropland had a reduction in grasshopper populations over the past few years. The whole of the State had unusually low populations in cropland during 1962. Rangeland had relatively small areas of threatening infestations, occurring in Custer, Haakon and Harding Counties. Around the middle of September, some scattered ranchers and farmers in Dewey County treated their winter wheat field borders for protection from grasshoppers. Throughout the early fall months, grasshoppers caused enough damage to edges of wheat fields that some of the margins had to be replanted. The egg survey consisted of between 75 to 80 stops in the State. Eggs could be readily found in central South Dakota where grasshoppers were numerous during the summer.

In general, the grasshopper situation did not develop into a serious problem in NORTH DAKOTA. Numbers per square yard ranged from noneconomic to threatening. However, some isolated cases of severe infestations were reported. The dominant species of grasshoppers on cropland were migratory grasshopper and two-striped grasshopper. Some Packard grasshopper, red-legged grasshopper, clear-winged grasshopper and *Melanoplus dawsoni* were also found. On rangeland, the dominant species were migratory grasshopper, *Ageneotettix deorum* and *Aulocara elliotti*. Clear-winged grasshopper was present in smaller numbers. The major egg hatch started in mid-June in North Dakota and continued through mid-July. Grasshoppers caused some damage to flax in the north central part of the State. In MINNESOTA, weather conditions for grasshopper egg and nymphal development were generally unfavorable over much of the State in 1962. Spring and early summer were characterized by long periods of cool, wet weather. This was especially true in the west central and northwest areas of the State. It was felt that the adverse weather conditions, along with greatly accelerated vegetative growth, were responsible for late hatch, slow development and, in some cases in western and northwest Minnesota, high nymphal mortality. The adult survey in August showed a marked population drop in the west central district from that of 1961. Alfalfa is the principal habitat infested by grasshoppers in Minnesota. The red-legged grasshopper is by far the dominant species; however, two-striped, differential and migratory grasshoppers are found dominant in some fields in the western and northwestern counties. Threatening to severe infestations continue to be scattered and localized. A general increase in threatening to severe populations was noted in the light sandy soils in much of Isanti, Anoka, Sherburne, west Benton and Morrison Counties. Threatening infestations still persist in Kittson and west Marshall Counties, but at a lower level than in 1961. A small area of threatening infestation in Yellow Medicine and Lac qui Parle Counties completes the picture of economic grasshopper populations in Minnesota. Grasshopper infestations in the remainder of the State have declined or remained at a low level.

Injury by grasshoppers was more evident during 1962 than in 1961 in WISCONSIN. Alfalfa in the central portion of the State was entirely stripped in some instances and moderate damage was manifest in many areas where numbers were in any way important. Cropping practices had the most important influence upon crops other than alfalfa. Where alfalfa had recently been cut during or shortly after grasshoppers had reached maturity, some injury to corn, soybeans, snap beans and tobacco was encountered. Red-legged grasshopper again accounted for about 90 percent of the populations involved, with differential grasshopper being the second most abundant species present. Differential grasshopper, as well as migratory grasshopper, appears to be most commonly encountered in corn fields where both leaf feeding and silk feeding frequently became noticeable in 1962. Two-striped grasshopper caused some concern in the central area. Red-legged grasshopper eggs began hatching in sandier areas of Wisconsin the first week of June; 5 days earlier than in 1961. Damage became noticeable in some areas by the end of July. The fall survey revealed an average of 10 per square yard for the State, which was the same as in 1960. Development was delayed, with fifth instars still present on October 9, and females still containing eggs were present as late as October 26. This delay in oviposition and prolonged development may be a hopeful indication that grasshopper populations may decrease in certain areas of Wisconsin, if not in most areas, in 1963. The total acreage of hay treated for grasshoppers in the State was 5,645 compared with 10,240 in 1961. There were 3,856,000 acres of hay planted in Wisconsin in 1962, 26,000 more than in 1961. Of the acreage treated in 1962, 1,000 were in Waupaca County and 1,500 in Waukesha County.

The grasshopper hatch was reported to be increasing generally by mid-June in IOWA. Infestations in July were rated light to severe, with the heavier populations being in the southern and central thirds of the State. However, 40 percent of the fields surveyed in the southern third and 50 percent of those in the central third of Iowa were rated as having light infestations. In MISSOURI, hatching of grasshoppers was spread out over a longer period than normal because of cool, wet conditions in the spring. Damage was not evident in any area during the spring and early summer due to an abundance of vegetation in the hatching areas. Extremely dry conditions during mid to late summer in central, north central and northeast Missouri caused a rapid migration of 'hoppers from waste areas to pastures, legumes and cultivated crops. Counts averaged as high as 33 'hoppers per square yard in pastures, 28 per square yard in legumes and 25 per square yard in cultivated crops. Pastures, already injured by drought, suffered the most damage throughout Missouri. In the central area, where pastures and legumes dried up first, corn and soybeans were damaged extensively in spots. The dominant species in Missouri in order of their importance were red-legged grasshopper, migratory grasshopper, differential grasshopper and two-striped grasshopper. Differential and red-legged grasshoppers were the principal species involved in a small area in northwestern ARKANSAS, but infestations were of minor importance.

Grasshoppers were more abundant in ILLINOIS during 1962 than they have been at any other time in the past 15 years. Early warning from entomologists and an extensive control program by farmers prevented much damage. An estimated 1,472,645 acres were treated in 1962, thereby saving farmers about $6,885,872. Red-legged grasshopper, differential grasshopper and some migratory grasshopper were noted. During May 28-31, populations averaged 302 per 100 sweeps (up to 108 per square yard) in grassy roadsides and other places in the east-southeast district. The grass was still succulent, but population pressures were causing the small 'hoppers to move into and severely defoliate marginal rows of corn and soybeans. A few third instars appeared June 3-8 and populations in grass averaged 36 per square yard in the west district and 29 per square yard in the central district. By June 11-15, many grassy roadsides, ditchbanks, fence rows and marginal rows of corn and soybeans had been treated in Illinois. Although populations were declining in grassy areas, hatch was just getting well started in clover and alfalfa. Average populations per square yard in grassy areas June 11-15 were 12 in the central district, 17 in west-southwest and 19 in east-southeast. In the northeast district there were 12.5 per sweep, and in the east, 23.2 per sweep. Occasional adult migratory grasshopper was observed in the east-southeast and west-southwest districts. There were 5 grasshoppers per linear foot in marginal rows of a soybean field in Will County. During June 24-29, hatch was nearly completed in the southern half of the State and well underway in northern Illinois. Populations in grassy areas then averaged 10.5 per square yard in the west-southwest district and 14 per square yard in the east-southeast. However, populations in clover and alfalfa averaged 20.3 per square yard in the west-southwest and 19.5 in the east-southeast. The week of July 8-13 showed that some clover and alfalfa fields in the west district had 25-30 percent of the leaf area removed from the plants and second to fourth instars ran from 80 to 180 per square yard. In the northwest district, populations were 3-90 (average 46 nymphs, mostly first to third instar) per square yard, with hatch still occurring in the northern 2 tiers of Illinois counties. Adults were common throughout the southern half of Illinois July 15-20, and a few adults were observed in the northern half of the State. In late July and August, some clover fields were completely stripped of leaves. As clover and alfalfa fields were cut, grasshoppers migrated into and damaged nearby corn and soybeans. One cornfield had all silk removed from tips of ears and some kernel damage was apparent; counts were 14 adults and nymphs per plant in marginal rows. One field of soybeans with 15 adults per foot of row had 75 percent of the leaf area removed in marginal rows and pod feeding was evident. Timely warnings of grasshopper presence and extensive control programs prevented much of the potential damage in Illinois. An estimated 235,128 acres of corn, 372,179 acres of soybeans, 699,438 acres of hay and pasture and 165,882 acres of fence rows, roadsides, ditchbanks, etc.,were treated to control this grasshopper outbreak.

Populations of Melanoplus spp. again increased over the preceding year in INDIANA. Damaging populations occurred in localized areas throughout the southern three-fourths of the State. The dominant species were red-legged grasshopper and differential grasshopper. In Decatur County, an infestation in one field of soybeans averaged 40 grasshoppers per square yard. In MICHIGAN, red-legged grasshopper and migratory grasshopper continued their low population trend of former years. Both species are in the southern part of the State, especially Montcalm County. No organized control program was carried out in 1962. Individual farmers treated crops such as potatoes for protection against migrating grasshoppers.

MORMON CRICKET (Anabrus simplex) infestations increased during 1962 in NEVADA. Surveys showed that approximately 30,600 acres are infested, with major increases occurring in Eureka, Lander and Pershing Counties. Total of 21,857 acres in San Juan County, UTAH, and 2,500 acres in the Kanosh area of Millard County, Utah, were aircraft baited during the year. Mormon crickets are a threat to rangelands in the Bear Top Mountain area of Daggett County and Kanosh area of Millard County for 1963. In NEBRASKA, Mormon cricket was present in small numbers in a solitary location in Dawes County; and in MONTANA, only small isolated bands were noted during the past 2 years in the Big Horn Mountains. Only scattered individual Mormon crickets, this species and others, were observed during the 1962 season in WASHINGTON and no concentrations required controls; this situation repeats the conditions encountered since the massive control work done during the late 1940's and early 1950's.

Larvae of ARMY CUTWORM (Chorizagrotis auxiliaris) were abundant in small grains and alfalfa in southwest NORTH DAKOTA during May, and locally heavy larval populations caused damage to winter wheat and alfalfa in the panhandle area of NEBRASKA during mid-April. Localized damage to oats occurred in early May in the northern part of Nebraska. The heaviest moth flights in central Nebraska occurred during mid-May and approximately June 1 in the panhandle area. Army cutworm was of economic importance in KANSAS only in a few wheat and alfalfa fields in the southern area, and the pest destroyed a field of winter wheat in Baca County, COLORADO. The insect was about normal in abundance in UTAH. However, larval infestations were found in several areas of WYOMING. Most damage occurred on alfalfa. The largest populations were found in Big Horn, Hot Springs, Fremont and Laramie Counties. In general, populations were larger than in 1961 in Wyoming. No extensive army cutworm outbreaks were reported in MONTANA, but scattered, light infestations occurred in Richland, Rosebud, Chouteau, Roosevelt and Cascade Counties. In IDAHO, larval populations of 1-6 per square foot were noted during late April in some rangeland areas of Gooding, Elmore and Owyhee Counties. Damage in Idaho was mostly confined to rangeland, with dryland grains and hay crops suffering only light damage in areas of Elmore, Owyhee and Butte Counties. The cutworm damaged alfalfa in Elko County, NEVADA, in early May, but was noticeably absent in CALIFORNIA following its heavy invasion in 1961. Army cutworm damaged alfalfa, vetch, flax, grain sorghum, Johnson grass, clover and other field crops in several areas of TEXAS, but was generally concentrated in several south central counties. Cutworms, mostly army cutworm, severely defoliated alfalfa in a number of fields in northern Dona Ana County, NEW MEXICO, during March and April. They also damaged Austrian winter peas, small grains and safflower in Luna County, New Mexico.

APHIDS in general appeared later than usual in CALIFORNIA and the first infestations were in alfalfa, beans and barley. Infestations eventually spread to corn plantings and a few miscellaneous forage crops without serious consequences.

Small Grain Insects

Highlights:

GREENBUG and ENGLISH GRAIN APHID were generally not a problem on small grains during 1962. Some damage did occur, however, in northeast North Dakota during August and in parts of Park County, Wyoming, and on the Eastern Shore of Maryland. CORN LEAF APHID reached economic levels on barley in Idaho and Nevada and in areas of other states, but was not a widespread problem on small grains. RICE DELPHACID was found in seven Louisiana parishes during the year, the first occurrence since 1959. Hoja blanca, transmitted by this delphacid, was not found. RICE STINK BUG was the principal pest of rice in Arkansas in 1962 and widespread infestations occurred in coastal rice-growing areas of Texas. Localized outbreaks of ARMYWORM were of some concern in 1962, the most noteworthy of which occurred on the Delmarva Peninsula and in areas of Wisconsin, Minnesota and Wyoming. FALL ARMYWORM caused heavy damage to small grains in Texas, and early planted, susceptible varieties of wheat showed considerable HESSIAN FLY damage during the fall in Kansas. A severe spring infestation of hessian fly is expected in Kansas where weather conditions are favorable. CEREAL LEAF BEETLE was recorded for the first time in the Western Hemisphere when an infestation was found in Berrien County, Michigan. It was later found to occur in Cass County, Michigan, and in La Porte and St. Joseph Counties, Indiana. State quarantines became effective in Michigan and Indiana and intensive surveys and chemical controls are planned for 1963. WIREWORMS caused considerable damage to small grains in Wyoming,and BROWN WHEAT MITE was numerous enough to warrant controls in Colorado and cause considerable damage in parts of Texas and New Mexico.

GREENBUG (*Schizaphis* (*Toxoptera*) *graminum*) reached economic levels on small grains in portions of northeastern and north central NORTH DAKOTA during 1962. It became a problem on wheat in the northeast during August, but in most cases the fields attacked were planted late. Greenbug was first found on May 8 in MINNESOTA, the south central district. Nearly all were alates, with only a few nymphs present. Although small grains were in the seedling stage and quite susceptible to greenbug feeding, very little damage was reported. By early June, the pest was found throughout Minnesota. However, populations generally remained low the entire season and did not present a problem. In WISCONSIN, adults began appearing in oat fields the fourth week of May, 2 weeks earlier than in 1961. Populations were low and, except for a few fields in Trempealeau County, no noticeable loss was evident. "Red leaf", the disease transmitted by this insect, was also very light in Wisconsin. Greenbug was first found May 21 in the central and west districts of ILLINOIS, but it did not build up and was very light throughout the season. Noneconomic levels were present in MISSOURI, NEBRASKA and KANSAS. Counts in Nebraska averaged 1 per 10 sweeps in the eastern area. In OKLAHOMA, damage was generally light throughout the season. Populations were active from January through early May in that State, with the highest populations being present in the Kingfisher-Garfield-Kay County area in late April after the wheat crop had reached the "boot" stage. The first fall activity in newly planted wheat was observed in mid-October, with noneconomic populations present in most areas of Oklahoma throughout the fall months. Practically no economic infestations occurred during the year in ARKANSAS and the pest did not cause general damage to small grains in TEXAS, but a few fields in the northwest and north central part of the latter State required controls. Greenbug was relatively light in eastern NEW MEXICO grain fields during the spring, but an apparent buildup was noted during November and December in winter wheat fields in the same area. In COLORADO, the aphid was light to moderate on wheat and present on malting barley in some areas. Controls were applied to the latter crop to prevent possible loss. Large populations of this grain aphid were found only in Park, Campbell and Big Horn Counties, WYOMING, on small grains. Damage was light in all areas of Wyoming except in parts of Park County where moderate losses occurred. In general, populations were much smaller than those of 1961 in Wyoming and below normal for the year in UTAH. Greenbug was abundant on grains in the eastern area of IDAHO during July and August.

ENGLISH GRAIN APHID (*Macrosiphum avenae*), like greenbug, was a problem on small grains in portions of northeastern and north central NORTH DAKOTA during 1962. Conditions were similar for both aphids. The English grain aphid was reported as noneconomic in NEVADA, UTAH, KANSAS, NEBRASKA, MINNESOTA and OKLAHOMA. In the latter State, populations were generally light from January through April and the first fall populations (very light) were noted in early November and existed the remainder of the year. In COLORADO, infestations were similar to those of greenbug. Colonies of English grain aphid appeared about three weeks later than in 1961 in WISCONSIN and populations remained relatively low throughout the season. Nymphs were present in ryegrass as late as October 23. The aphid was above normal in abundance on small grains on the Eastern Shore of

MARYLAND, but were held in check during late May by parasites and predators. Counts of 15 per sweep were found in Franklin County, PENNSYLVANIA, wheat. English grain aphid was abundant on grains in eastern IDAHO during July and August, and this aphid is one of the few that is numerous on small grains in ALASKA. Barley yellow dwarf is spreading in Alaska, but definite vectors are still unknown in that State.

CORN LEAF APHID (Rhopalosiphum maidis) reached economic levels in barley in Clark, Jefferson, Bonneville and Bingham Counties, IDAHO, by July 20, and infestations of the aphid were evident on wheat, oats and many grasses in Bingham and Power Counties. Considerable yellow-dwarf damage occurred in late-planted barley in Butte, Bonneville, Bingham and Power Counties, Idaho, as a result of aphid infestations. Infestations were severe in NEVADA, especially in central counties. Heavy populations developed on barley in Clark County in April and in the central and northern counties of Nevada in June. In the latter areas, insecticides were applied for control. Medium populations of the aphid were present on barley in Monterey County, CALIFORNIA, and light to medium infestations were present on barley in ARIZONA during February and March. In NEW MEXICO, corn leaf aphid began building up in barley fields in Dona Ana, Sierra and Eddy Counties, and Animas Valley, Hidalgo County, in April. Populations were apparently kept under control by beneficial insects, except in a few fields which had to be treated in northern Eddy County and an occasional field in Dona Ana County. Limited numbers of the aphid were present in TEXAS small grain fields and generally light populations existed in OKLAHOMA throughout 1962. Only localized damage was noted in southwest Oklahoma where high populations caused heavy honeydew secretions on maturing heads. Generally, populations were not as high as in 1961 in this State. Corn leaf aphid caused some concern in insolated fields of wheat and barley in NORTH DAKOTA and low populations were reported on barley in northwest MINNESOTA.

APPLE GRAIN APHID (Rhopalosiphum fitchii) was reported heavy on oats at Mapleton and Bridgewater, Aroostook County, MAINE, and populations were more abundant than normal in the spring in UTAH. Limited numbers were present on small grains in TEXAS and MISSOURI, and noneconomic numbers were present in KANSAS and OKLAHOMA. In the latter State, activity was observed from early January to early May, with the return of fall populations in early November continuing through the remainder of the year. Highest counts were reached during late April in the north central areas of Oklahoma.

Apple grain aphid and English grain aphid were less numerous on oats and less barley yellow dwarf virus was present in western WASHINGTON than usual, apparently reduced throughout the State by winter killing (1961-1962); however, they were building up in fall-planted wheat in eastern Washington during the fall and through the mild weather of December. There was considerably obvious chlorosis of plants during this latter period.

The largest populations of a MEDITERRANEAN GRAIN APHID (Rhopalosiphum rufiabdominalis) in WYOMING occurred in the southeastern area, but they were not as large as in 1961. The aphid caused considerable damage in Laramie County and controls were applied to a few fields. In KANSAS, noneconomic populations of R. rufiabdominalis were present in most wheat fields examined in the fall. An undetermined APHID caused some problem in the southern Piedmont and Coastal Plain of NORTH CAROLINA in small grains, particularly oats, as the vector of yellow-dwarf virus. Sipha argopyrella averaged 4 per sweep in wheat in Franklin County, PENNSYLVANIA.

RICE DELPHACID (Sogata orizicola) was found in LOUISIANA; the first record of this vector of hoja blanca in the United States since it was found in Louisiana in 1959. It was collected in Louisiana in Iberia Parish July 16. Later, it was detected in St. Mary, St. Martin, St. James, Vermilion, Evangeline and St. John the Baptist Parishes. A vigorous eradication campaign was conducted by State and Federal agencies. All of the 35 fields found to be infested were treated with insecticides. No specimens were collected during intensive surveys of late October and early November. Surveys for disease and/or vector conducted on 201,812 acres in ARKANSAS, FLORIDA, Louisiana, MISSISSIPPI, SOUTH CAROLINA and TEXAS during 1962 with no evidence of the disease being discovered in any State. The vector was found only in Louisiana. Another LEAFHOPPER (Cuerna costalis) was light to moderate on wheat in COLORADO. A PLANT BUG (Trigonotylus ruficornis) was common in grass in the southeast district of ILLINOIS in May and June, and all stages of the bug were found in wheat on May 8. On June 10 to 15, it ranged 0-10 (average 3) adults and 0-160 (average 70) nymphs per 100 sweeps in wheat in the east-southeast district. A CORIED BUG (Arhyssus scutatus) occurred in light to medium numbers in grain fields in Siskiyou County, CALIFORNIA.

RICE STINK BUG (Oebalus pugnax pugnax) was the principal pest of rice in ARKANSAS in 1962. A number of fields was surveyed weekly to detect seasonal development. Considerable acreage was treated in Arkansas, some of which was justified and some not. Excessive rain in June resulted in heavy growth of barnyardgrass, the main early host of this species. Moderate, widespread infestations occurred in the coastal rice-growing counties of TEXAS and about normal populations were present in LOUISIANA.

A heavy outbreak of ARMYWORM (Pseudaletia unipuncta) occurred in Worcester County, MARYLAND, during May on young barley and oats; several localities needed treatments. Economic infestations also occurred in Dorchester and Kent Counties, Maryland. Considerable damage to rye was observed in an area of Sussex County, DELAWARE, in late May. A localized outbreak occurred on the Eastern Shore of VIRGINIA about May 15. Damage was heavy in some sections, with corn and oats being hurt the most. Medium infestations were encountered on oats in Hanover County and on small grains in an area of Culpeper County, both in Virginia. However, there were no widespread outbreaks in that State in 1962. Armyworm caused considerable localized damage to small grains in Calhoun County, SOUTH CAROLINA, and local, heavy infestations were present on small grains in several middle GEORGIA counties. Armyworm infestations on small grain in ARKANSAS were comparable with 1961, with considerable acreage being treated. An infestation of seedling rice in Arkansas was the first observation of this type of damage by this species in the State. In MISSOURI, the first larvae of the season were observed in early May on small grains in the southeast section. The high counts of the year were reported in late May in the central and southeast areas of the State. These counts ranged from 3 to 35 larvae per square yard and were made in barley. Very little chemical control was used on armyworms this past season in Missouri. Larvae appeared throughout southern ILLINOIS May 6-11. In late May, some treatments were necessary in small grain in southwestern Illinois and a few oat fields were damaged in northern Illinois.

Armyworm moths were low in numbers during the first flight in INDIANA,but following favorable growing conditions for the first-generation larvae, the second flight was very large. In WISCONSIN, flights of armyworm moths began appearing early in the spring and attained a peak during the first and second weeks of June. The difference this season was that populations were more than ten times as great as in 1961 and continued heavy flights occurred for approximately a month and a half. Larval infestations of consequence in Wisconsin were confined mostly to an area of eastern Rock, Dane, southern Columbia, northwestern Dodge, Fond du Lac and a small portion of central Iowa counties. A few larvae were found in oats during the third week of June. Some treatment was necessary before parasitism became effective during the latter part of July. Pupation commenced in Columbia County during the first week of August and the second-generation larvae were of no consequence. Actual damage during the year in Wisconsin was generally light, although a few fields of oats were nearly destroyed.

Blacklight traps began collecting armyworm moths toward the end of May in MINNESOTA. No infestations in small grains were observed until the second week of July. It was present throughout the State, but high populations were widely scattered. Heavy infestations were reported from Le Sueur, Renville, Mower, Aitkin, Swift, Polk, Marshall and Kittson Counties. Isolated, economic infestations were observed in small grains in NORTH DAKOTA and damage from this species and other armyworms in SOUTH DAKOTA was slight in 1962. In the latter State, scattered outbreaks of little importance were reported around the Martin area (Bennett County) and also around the Aberdeen area (Brown County). Small numbers were also collected in the blacklight trap on the South Dakota State College campus. Larval counts in NEBRASKA ranged 1-5 per 10 sweeps in small grains in the northeast in June and July, and heavy adult flights were present in the State in mid-June and the first week of August. One severe armyworm infestation was found in Goshen County, WYOMING, which damaged oats just before harvesting. Control efforts contained this outbreak in a small area and kept losses at a minimum. Counts of larvae under windrowed oats were as high as 50 to 60 per square foot. Armyworm was below normal in abundance in UTAH and noneconomic in KANSAS during 1962.

FALL ARMYWORM (Laphygma frugiperda) caused heavy damage to small grains in TEXAS and was prevalent in LOUISIANA. WHEAT HEAD ARMYWORM (Faronta diffusa) and PALE WESTERN CUTWORM (Agrotis orthogonia) caused light to moderate damage to wheat in COLORADO. LESSER CORNSTALK BORER (Elasmopalpus lignosellus) killed some wheat during October in Baylor County, TEXAS. It was eating the center inside of wheat stalks below the ground.

HESSIAN FLY (Phytophaga destructor) infestations increased during the spring in KANSAS, but damage was not great to the harvested crop. Early planted, susceptible varieties showed considerable damage in the fall in the northwest, west central, north central, central, northeast and east central districts of Kansas. Where suitable weather conditions exist during the spring of 1963, a severe infestation is expected. In NEBRASKA, wheat in Franklin and Harlan Counties had spotted infestations up to 50 percent in June. Elsewhere in southern and eastern Nebraska, infestations ranged from one to 10 percent. Fall surveys in the State showed scattered infestations in fields in the southwest, south, southeast and east, ranging from zero to 75 percent. Some damage to spring wheat was observed in the Enderlin area of NORTH DAKOTA. Damage in MONTANA was light and sporadic and only in the eastern part of the State. However, a general light infestation was found in Teton, Pondera and Chouteau Counties, with stem infestation running as high as 10 percent. Damage to wheat in MISSOURI was lighter statewide than in 1961. Light to moderate damage was evident in spots in the southwest, east central and northeast areas. The numbers of maggots per 100 stems in these areas of Missouri ranged from zero to 143. The county averages of maggots per 100 stems ranged from 7.25 to 30.8. Populations of hessian fly increased in ILLINOIS from 9.6 puparia per 100 tillers of wheat in 1961 to 13.9 per 100 tillers in 1962. An estimated 32.1 percent of all wheat was seeded one week or more before the "fly-free date" in 1962. An estimated 25.2 percent of all wheat in Illinois was seeded with resistant varieties. Most of the resistant varieties were seeded early. Infestations also increased in INDIANA over 1961. Seventy-five samples from 36 counties ranged from zero to 45 percent infestation, and averaged 10 percent for susceptible varieties. Resistant varieties ranged from zero to 9.4 percent, and averaged 3 percent. Evidence of infestation was observed in a high percentage of southern MICHIGAN counties. Resistant varieties of wheat appeared to be damaged little by this pest.

WHEAT STEM MAGGOT (Meromyza americana) was present throughout MINNESOTA, but populations were very low, less than one percent. In KANSAS, wheat stem maggot was of importance in the 1962 harvested crop only in a very few fields in the eastern area. Maggot-infested plants were found in several fields during the fall. A special survey in Gilliam and Sherman Counties, OREGON, for the AGROMYZID (Cerodontha dorsalis) revealed extremely small numbers present in 16 fields checked during May. WHEAT MIDGE (Sitodiplosis mosellana) caused some shriveling of the kernel of wheat in PENNSYLVANIA. Medium populations of a LEAF MINER (Hydrellia griseola) were evident locally in rice plantings in Sutter County, CALIFORNIA, and medium in Butte County, same State. Treatments in other areas of California prevented a buildup. Probably due to the cooler weather, this leaf miner was not the problem in 1962 that it had been in past years in the State. In TEXAS, larvae of a CECIDOMYID, determination of which is pending, infested approximately 5 percent of the wheat crop in Wilbarger County during May. The larvae were found between the leaf sheath and stem above the last node, but no damage was apparent.

Infestations of WHEAT JOINTWORM (Harmolita tritici) in INDIANA, based on 56 samples from 31 counties, showed an average infestation of 7.5 percent, which was an increase over 1961. Infestations in the State ranged 0-88 percent of the stems infested per field sample. Wheat jointworm was noneconomic in KANSAS and below normal in UTAH. The same was true for WHEAT STRAW-WORM (H. grandis) in UTAH. WHEAT STEM SAWFLY (Cephus cinctus) infested 9 percent of wheat stems in spot check of counties north and west of Minot, NORTH DAKOTA.

CEREAL LEAF BEETLE (Oulema melanopa) was the most important cereal insect problem in MICHIGAN in 1962. The infestation, found on small grains and other grass in Berrien and Cass Counties, caused considerable concern. This was the first recorded occurrence of this important pest in the Western Hemisphere. The specific determination was made in July 1962. Cereal leaf beetle was reported for the first time in INDIANA in August 1962, when infestations were found in St. Joseph and La Porte Counties. Its first occurrence in these two counties of Indiana and the adjacent area in Michigan suggests that cereal leaf beetle may have entered the United States by way of the St. Lawrence Seaway. The total infested area in the two states is approximately 960 square miles, 900 in MICHIGAN and 60 in INDIANA. State quarantines became effective in Michigan on October 15, 1962, and in Indiana on November 12, 1962. Commodity treatments and other certification procedures are being used to permit products that present a hazard of spread to move in commerce. In addition, surveys will be conducted this spring throughout the generally infested area to delimit the infestation, and detection surveys will be conducted in other small grain-producing areas to determine their freedom from infestation. Also, chemical treatments of known infestations will be accomplished as the initial step toward eradication.

The first infestation of a TENEBRIONID (Blapstinus substriatus) in large numbers since 1931 was reported in 1962 in eastern Teton and northern Cascade Counties, MONTANA. Damage was not severe and controls were not necessary. RICE WATER WEEVIL (Lissorhoptrus oryzophilus) and a LEAF BEETLE (Maecolaspis sp.) were about normal on rice in LOUISIANA.

WIREWORMS were especially serious in fall-seeded wheat in several south central MICHIGAN counties during 1962. Limonius spp. caused considerable damage to small grains in WYOMING, with the largest populations being present in Goshen, Laramie, Platte, Hot Springs, Big Horn, Park and Sheridan Counties. In SOUTH CAROLINA, SAND WIREWORM (Horistonotus uhlerii) was not reported as a pest of small grains. A BILLBUG (Sphenophorus sp.) was observed in a high percentage of wheat fields in southern MICHIGAN, but BILLBUG damage to small grains was markedly reduced in SOUTH CAROLINA.

In CALIFORNIA, medium populations of a tadpole shrimp (Triops longicaudatus) occurred in all rice districts in Butte County; damage was associated with a WATER SCAVENGER BEETLE digging in young rice to get the shrimp.

A BARLEY THRIPS (Limothrips denticornis) was active in NORTH DAKOTA, but generally did not reach economic levels. It was also present again in MINNESOTA, but in lower numbers, being found only in west central and northwest districts. In MARYLAND, unspecified THRIPS were again abundant and caused noticeable streaking of barley and wheat.

BROWN WHEAT MITE (Petrobia latens) occurred in significant numbers on wheat in the TEXAS Panhandle, but it was impossible to evaluate the damage caused because of the accompanying freeze and drought damage. In NEW MEXICO, light to unusually heavy infestations damaged wheat and alfalfa in most counties where these crops are grown. In southeastern COLORADO, where drought conditions existed, populations of brown wheat mite varied from 10 to 120 per linear foot of drill row in wheat and caused losses of 10 to 40 percent. It was numerous enough in Garfield County, Colorado, to require the use of controls where counts averaged 20 to 30 per plant. Reduction in barley production by insects was negligible in 1962 in most areas of Colorado. However, early in the spring, brown wheat mite was present on barley in Baca County in sufficient numbers to require controls. Trace numbers of the mite were present in other areas of Colorado, but did not cause any loss to barley. Some controls were applied to prevent damage, however. Light, spotted infestations were present in Cheyenne County, NEBRASKA, wheat in May, and the mite was not present in economic numbers in KANSAS. Numbers were below normal in UTAH and lighter than in 1961 in NEVADA, but heavy infestations occurred on alfalfa and small grains in White Pine County, Nevada, during June.

WINTER GRAIN MITE (*Penthaleus major*) occurred in damaging numbers on small grains in several north central TEXAS counties and controls were applied in many instances. Populations were not economic in KANSAS and below normal in UTAH. WHEAT CURL MITE (*Aceria tulipae*) caused 5 to 75 percent reduction in yield of wheat in Pueblo and Huerfano Counties.

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